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Exploring Parental Influence on the Progression of Alcohol Use in Mexican-Heritage Youth: A Latent Transition Analysis

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Abstract

Mexican-heritage youth are members of the fastest growing minority group and are at particular risk for substance use including alcohol consumption. Youth face numerous risk factors including positive descriptions of substance use on media and peer offers that are potentially ameliorated by parental anti-substance use socialization efforts. Guided by primary socialization theory and the theory of planned behavior, the present study posited eight research questions to identify discrete subgroups/patterns of Mexican-heritage youth alcohol use behavior and parental influence on youth outcomes. Longitudinal survey data ($n = 1,147$) from youth in 29 public schools located in Phoenix, Arizona were collected over three years. Latent class and transition analyses identified four discrete subgroups characterized by response patterns of alcohol use behaviors and perceptions in Mexican-heritage youth: 1) Non-drinker, 2) Potential drinker, 3) Experimenter, and 4) Regular drinker. Targeted parent-child communication about alcohol and parental monitoring were found to be significant predictors for youth alcohol use. Research implications and future directions are suggested.

Keywords

youth substance use; latent class analysis; latent transition analysis; targeted parent-child communication; parental monitoring

A recent report of the National Survey on Drug Use and Health indicates that 38.1% of youth aged 12 to 17 years self-report as current alcohol drinkers and that high levels of alcohol consumption co-occur with tobacco and other illicit drug use (Substance Abuse and

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Mental Health Services Administration [SAMHSA], 2012). Youth face numerous risk factors including positive descriptions of substance use on media (Sargent, Wills, Stoolmiller, Gibson, & Gibbons, 2006; Wills, Sargent, Gibbons, Gerrard, & Stoolmiller, 2009) and alcohol offers from peers (Allen, Donohue, Griffin, Ryan, & Turner, 2003; Mundt, 2011) and the rate for alcohol use drastically increases as youth grow older (SAMHSA, 2012). The subgroup of Mexican-heritage youth, members of the fastest growing minority group (U.S. Census Bureau, 2006), are at particular risk for substance use including alcohol consumption. Notable potential risks include a parent-child acculturation gap (Pasch, Deardorff, Tschann, Flores, Penilla, & Pantoja, 2006) and peer pressure (Parsai, Voisine, Marsiglia, Kulis, & Nieri, 2008). Others are put at risk for substance abuse by perceived discrimination and acculturation stress (Kam, Cleveland, & Hecht, 2010; Kam & Cleveland, 2011). Approximately 35% of Mexican-heritage youth in grades 7–12 have used alcohol or other drugs (Kopak, Chen, Haas, & Gilmore, 2012) and their alcohol consumption increases over time (Kopak, 2013). The prevalence of alcohol use in Mexican-heritage youth is 7% higher than the national average rate of youth alcohol use (Johnston, O'Malley, Bachman, & Schulenberg, 2013). Due to the growing concern of alcohol use among Mexican-heritage youth, they are the focus of this study.

According to Primary Socialization Theory (PST, Oetting & Donnermeyer, 1998), parents have the potential to play an important role in influencing youth to establish prosocial and/or deviant norms and behaviors. PST suggests that parents socialize youth against substance and substance use through interaction and communication. During this anti-substance use socialization process, parent-child communication plays an important role in positively influencing youth developmental outcomes (e. g., anti-substance use norms, attitude, intention, and actual substance use) (Elek, Miller-Day, & Hecht, 2006; Kam, Matsunaga, Hecht, & Ndiaye, 2009). More specifically, targeted parent-child communication about alcohol use functions as a protective factor to prevent youth from alcohol use (Miller-Day & Kam, 2010; Reimuller, Hussong, & Ennett, 2011). Parents also use active monitoring and supervising to prevent youth from using alcohol (Griffin, Botvin, Scheier, Diaz, & Miller, 2000; Webb, Bray, Getz, & Adams, 2002). An understanding of both the risk and protective factors that encourage and discourage youth alcohol use is vital because early alcohol use may lead to devastating consequences (Burrow-Sanchez, 2006; Johnson, O'Malley, Bachman, & Schulenberg, 2006). These factors are particularly salient among Mexican American families (Martinez & Eddy, 2005; Warren, Wagstaff, Hecht, & Elek, 2008).

Although the importance of parental anti-substance use socialization in Mexican-heritage families is evident from previous research, the knowledge base is limited by cross-sectional designs that focused on the relations between parental norms and youth internal norms and attitudes (Kam et al., 2009), the relations between parent-child communication and alcohol use (Martyn et al., 2009) or the relations between parental monitoring and youth outcomes respectively (Marsiglia, Nagoshi, Parsai, Booth, & Castro, 2014; Strunin et al., 2013). The present study attempts to fill a research gap by investigating longitudinal patterns of Mexican-heritage youth alcohol use in relation to parental anti-substance use socialization efforts. More specifically, this study aims to identify characteristics of Mexican-heritage youth alcohol use and its transitions over three different time points. The current study also takes into account whether general parent-child communication, targeted parent-child

communication about alcohol, and parental monitoring may protect Mexican-heritage youth from alcohol use over time.

Primary Socialization Theory (Oetting & Donnermeyer, 1998) suggests that parents are one of the influential agents that positively socialize youth norms, attitude, and intention toward deviant behaviors such as alcohol use. General parent-child communication shows positive effects on youth psychological and behavioral outcomes during a developmental period of time (Davidson & Cardemil, 2009; Shin, Lee, & Miller-Day, 2013). Although general parent-child communication (i.e., openness) can positively shape youth developmental outcomes, family scholars have argued that effective parental prevention efforts occur primarily through parent-child communication about alcohol. Empirical studies present evidence that targeted parent-child communication about alcohol is significantly associated with decreases in youth alcohol consumption (Miller-Day & Kam, 2010; Reimuller et al., 2011) and is particularly effective in Mexican-heritage youth (Kam, Potocki, & Hecht, 2012; Shin & Hecht, 2013).

Parental monitoring is “a set of correlated parental behaviors involving attention to and tracking of the child’s whereabouts, activities, and adaptations” (Dishion & McMahon, 1998, p. 61). Previous research has demonstrated the importance of parental monitoring in various areas of youth developmental outcomes, including self-esteem (Parker & Benson, 2004) and academic achievement (Bean, Bush, McKenry, & Wilson, 2003). Moreover, parental monitoring shows positive evidence of protecting youth from risky behaviors such as drug and alcohol use (Martins, Storr, Alexandre, & Chilcoat, 2008; Webb et al., 2002), smoking (Chen, Storr, & Anthony, 2005; Diclemente et al., 2001), and earlier initiation of substance use (Chilcoat, Dishion, & Anthony, 1996). For Mexican-heritage youth alcohol use, in particular, parental monitoring is identified as one of the strongest predictors of binge drinking and other drinking related behaviors (Martinez & Eddy, 2005). When higher levels of parental monitoring are perceived, alcohol use decreases (Parsai, Marsiglia, & Kulis, 2010; Strunin et al., 2013).

Although previous research supports the direct and indirect effects of parental factors (i.e., general parent-child communication, targeted parent-child communication about alcohol, and parental monitoring) on youth alcohol use intention and recent alcohol use, less is known about the longitudinal effects of these factors on youth alcohol use patterns. Moreover, whether parental factors predict the transitions of youth alcohol use patterns over time remain unanswered, which affords the opportunity of the present study.

The theory of Planned Behavior (Ajzen, 1991) is a behavioral change model that explains and predicts individuals’ behavioral intention through three main factors: attitudes toward a behavior, subjective norms, and perceived behavioral control. A study on Mexican-heritage youth substance use (Kam et al., 2009) extended the concept of norms in TPB and suggested that norms are multidimensional, consisting of parental injunctive, peer injunctive, descriptive, and personal norms. Furthermore, it was found that positive attitude and personal norms mediated the effects of parental injunctive and peer injunctive norms on Mexican-heritage youth substance use intention and actual behavior. These findings highlight the importance of accounting for different types of norms and attitudes in

understanding and predicting Mexican-heritage youth behavioral intention and their substance use behavior. Hence, the present study includes six factors - personal norms, peer norms, parental injunctive norms, attitude, intention, and recent alcohol use.

Guided by primary socialization theory and the theory of planned behavior, the present study poses eight research questions as following:

RQ1: What are the characteristics of Mexican-heritage youth alcohol use at each time point?

RQ2: What are the major trends of Mexican-heritage youth alcohol use patterns over time?

RQ3: How does general parent-child communication predict the characteristics of Mexican-heritage youth alcohol use at the baseline?

RQ4: How does targeted parent-child communication about alcohol predict the characteristics of Mexican-heritage youth alcohol use at the baseline?

RQ5: How does parental monitoring predict the characteristics of Mexican-heritage youth alcohol use at the baseline?

RQ6: How does general parent-child communication predict the major trends of Mexican-heritage youth alcohol use patterns over time?

RQ7: How does targeted parent-child communication about alcohol predict the major trends of Mexican-heritage youth alcohol use patterns over time?

RQ8: How does parental monitoring predict the major trends of Mexican-heritage youth alcohol use patterns over time?

Methods

Participants and procedures

The current study is part of a larger school-based substance prevention intervention project funded by the National Institute of Drug Abuse (NIDA). Parental consent and student assent were obtained prior to participation. Consent was obtained from 96% of the overall student population at these schools. In the fall of 2005, self-reported data were collected from 2,090 consented students in 29 public middle schools located in Phoenix, Arizona and overall completion rate of the Time 1 (T1) or baseline surveys was 87% for consented participants. For the present study, we used survey responses from 1,147 self-identified Mexican, Mexican American, and Chicano students. Two follow-up surveys (T2: Fall/2006 and T3: Fall/2007) were administered in about 12-month interval. The response rates on the follow-up surveys were 61% across survey items. Overall, the average complete rate of the longitudinal surveys was 70%, which compares favorably with similar school-based project on adolescents (e. g., 67%; Webb et al., 2002). All the participating students completed assent forms, and their parents completed consent forms informing them of the voluntary and confidential nature of the students' questionnaire participation. Students were not compensated for their survey participations. The mean age at T1 was 11.7 years ($SD = 0.61$) and females were 51% of the participants. The mean of their acculturation attitudes was 3.2

($SD = .63$) using a 4-point likert scale, indicating a strong liking for both US and their own culture (i. e., biculturalism). Over 60% of students lived all their life in the US, while about 10% moved to the US within 5 years. The vast majority of students (93%) reported that they participated in either free lunch or reduced lunch program, indicating low socioeconomic status. The survey protocols were reviewed and approved by the Institutional Review Board.

Measures

The key indicators (at T1, T2 and T3) were *lifetime alcohol use*, “have you tried alcohol even if only once or only a little” (1 = yes, 2 = no); *last-30 day alcohol use*, “how many drinks of alcohol have you had in the last 30 days” (1 = none to 7 = more than 30: dichotomized as “drank” or “not”); *intent to use alcohol*, “if you have a chance this weekend, would you use alcohol” (1 = definitely yes, 2 = yes, 3 = no, 4 = definitely no: dichotomized as “yes” or “no”); *positive expectancies regarding alcohol use*, “drinking alcohol makes parties more fun” (1= strong agree, 2 = agree, 3 = disagree, 4 = strongly disagree: dichotomized as “agree” or “disagree”); *parental anti-alcohol norms*, “how angry would your parents be if they found out you drank alcohol” (1 = not at all angry, 2 = a little angry, 3 = pretty angry, 4 = very angry: recoded into “angry” or “not angry”); *peer anti-alcohol norms*, “how would your best friend react if you got drunk” (1= very positively ok, 2 = positively ok, 3 = no reaction, 4 = negatively not ok, 5 = very negatively not ok: recoded into “positively ok”, “no reaction”, or “negatively not ok”); and *personal anti-alcohol norms*, “is it OK for some your age to drink alcohol” (1 = definitely ok, 2 = ok, 3 = not ok, 4 = definitely not ok: dichotomized as “ok” or “not ok”). As single item measures, no reliability data are available. However, these are common measures for reporting substance use (Elek et al., 2006; Graham, Flay, Johnson, Hansen, Grossman, & Sobel, 1984; Hansen & Graham, 1991).

The following covariates at T1 were included in the logistic regression models predicting latent class membership and transition probabilities:

General parent-child communication—Three items were used to assess openness in parent-child communication excluding any reference to alcohol (Fitzpatrick & Ritchie, 1994). Students responded to the following items on a 5-point scale (1 = “disagree a lot” to 5 = “agree a lot”): “at least one of my parents...listens to my point of view,” “...says it’s important to get my ideas across even if others don’t like it,” and “...asks for my opinion when our family is discussing something” ($\alpha = .82$).

Targeted parent-child communication about alcohol—Targeted parent-child communication about alcohol ($\alpha = .89$) was measured with nine items (Miller-Day & Kam, 2010). Items asked students to share how frequently (never, occasionally, quite often, all the time) they engaged in parent-child communication using various conversational strategies such as lecturing, warning of dangers, commenting on media portrayals of drinking and smoking, and soliciting youths’ opinions about substance use.

Parental monitoring—Five items were used to assess parental monitoring knowledge and behavior (Warren et al., 2008). Items included youth perceptions of parental awareness what

they do during the free time and who to hang out. Items also asked students to report frequency of monitoring behaviors including asking questions and setting up a rule to come back home after hang out with friends. Four response options were provided (1 = always, 2 = often, 3 = sometimes, 4 = never) ($\alpha = .82$). In addition, gender (1 = male, 2 = female) and age were included in the all the statistical models.

Data Analytic Plan

The analysis plan for the current study involved four steps. First, prior to the LCA/LTA analyses, all indicators subjected to the LCA/LTA models were recoded into either binary or three categories for easy implementation and interpretation of the analyses. Second, latent class analyses were conducted to identify discrete subgroups characterized by perceptual and behavioral patterns of alcohol use in Mexican-heritage youth. LCA is known as an effective approach to classifying individuals into distinctive and theoretically meaningful subgroups/classes that represent particular response patterns of multiple categorical indicators in the complex array of data (Collins & Lanza, 2010). One notable advantage over traditional clustering techniques is that it enables investigators to determine optimal number of subgroups/classes by assessing and comparing multiple models with different number of classes in a systematic manner (DiStefano & Kamphaus, 2006). Models specifying 1 to 6 classes were initially tested. The primary fit indices used to assess the model fit of the multiple LCA models were the Akaike information criteria (AIC), Bayesian information criteria (BIC): the lower AIC/BIC, the better the model fit (Collins & Lanza, 2010). Entropy was also utilized as an evaluation index; values of entropy closer to 1.00 are better and a model with entropy greater than .80 is considered acceptable. Additionally, all the extracted subgroups/classes were interpreted based on their distinguishable characteristics and theoretical/empirical evidence.

Next, based upon the classes extracted from the LCAs, a latent transition analysis was performed to investigate any change in the characteristics of Mexican-heritage youth alcohol use over time. LTA is a variant of LCA that identifies underlying stage-sequential patterns using multiple observed indicators in longitudinal data (Collins & Lanza, 2010; Lanza, Dziak, Huang, Wagner, & Collins, 2013). The longitudinal technique is relevant in the current context since it can be used to estimate not only prevalence of the extracted latent classes at each time point, but also the patterns of change in the class membership and transition probabilities across time. AIC, BIC, and entropy were utilized as the primary model evaluation criteria. The conceptual/theoretical interpretability was also considered to assess the model fit.

Finally, within the latent transition modeling framework, logistic regression analyses were performed to estimate the effects of covariates on latent class membership and transition probabilities (T1 to T2 and T2 to T3). The analyses generated regression coefficients and their corresponding transformations to odds ratios.

All analyses were carried out using two SAS procedures, *Proc LCA* (Lanza, Collins, Lemmon, & Schafer, 2007) and *Proc LTA* Version 1.3.1. (Lanza & Collins, 2008), which are freeware user procedures developed by The Methodology Center of The Pennsylvania State University. The technical restriction of SAS *proc LCA/LTA* procedure is that the

procedure computes the odds ratios for the effects of covariates in a LTA model, but it does not compute their confidence intervals. The SAS procedure computes both ORs and CIs for the effects of covariates in a LCA model. All model parameters were estimated by maximum likelihood using an expectation-maximization (EM) algorithm. Missing data were handled in this procedure with the assumption that the data are missing at random (Lanza et al., 2007). Missing data were accommodated using a full-information maximum likelihood (FIML) technique with the assumption that the data are missing at random (MAR).

Results

Identifying Discrete Subgroups Characterized by Alcohol Use Patterns (RQ1)

Latent class analyses (LCA) were performed using T1 data to identify discrete subgroups (classes) characterized by Mexican-heritage youth alcohol use patterns. A series of model comparisons across multiple LCA models specifying 1–6 classes at T1 suggested that a four-class solution appeared most suitable. The analyses started using an one-class model by restricting the data to a one-class solution, which then was compared to models that have larger class solutions (e.g., two-, three-, four-class, and so forth). Each model specifying an additional class resulted in substantial reduction in AIC and BIC up to four-class solution. When fifth- and sixth-classes were added to the LCA model, however, the amounts of the indices decreased were negligible (e.g., $AIC_{4 \rightarrow 5 \text{ class at T1}} = -1.28$) or they started being increased (e.g., $BIC_{4 \rightarrow 5 \text{ class at T1}} = 44.09$). In addition, the four-class model demonstrated an adequate level of entropy (0.83). Inspection of the classes in each model indicated that the fifth and sixth classes were seen as marginal subgroups of one particular class identified in the proceeding model, whereas all classes extracted in the four-class model showed clearly distinct patterns.

Once the optimal number of classes were determined using T1 data, two additional LCAs were run using the follow-up data (T2 and T3) to examine whether the same response patterns were observed in the data. These response patterns in the four-class models were consistent across the three time points (T1, T2 and T3). For the reasons, we concluded that the four-class model provided an adequate representation of the data and had clearly interpretable latent classes. Table 1 presents fit statistics for the LCA models.

The four classes identified by the LCAs are as follows: The first class, labelled *Non-Drinker*, is a subgroup of Mexican-heritage youths who was characterized by a minimal level of alcohol use experience (recent and lifetime use) and intentions as well as a very high likelihood of having strong anti-alcohol norms. The second class, which was termed *Potential Drinker*, was characterized by somewhat different response patterns. Like the Non-Drinker class, the second class was endorsed by a very low level of lifetime and recent alcohol use. However it showed a relatively high likelihood of having positive alcohol expectancies and a moderate level of anti-alcohol norms. The third class is termed *Experimenter*. This subgroup was characterized by the contrast between a fairly high likelihood of alcohol use experience and a relatively low likelihood of alcohol use intentions and expectancies. It also exhibited a high likelihood of having strong anti-alcohol norms. Finally, the fourth class had characteristics indicating a high likelihood of alcohol use experience and intentions and a low likelihood of having anti-alcohol norms. For the

reasons, the last class was referred to as *Regular Drinker*. Each class showed distinct characteristics based on different response patterns and these distinct response patterns were consistent across the three time points. To illustrate, Table 2 provides item-response probabilities of the four-class model at T1.

Identifying Underlying Stage-Sequential Alcohol Use Patterns (RQ2)

A three-time, four-status LTA model was built based on the four-class model identified by the LCA model comparisons. The measurement parts of the LTA model (i.e., item-response probabilities of the indicators) were restricted to be equal across times. By constraining all the indicators to operate in the same manner across the three time points, the same subgroup across times would represent the same characteristics. The analysis estimated latent status prevalence, transition probabilities, and item-response probabilities.

As Table 3 shows, the same labels were assigned to the latent statuses, which are equivalent to classes in LCA: Non-Drinker, Potential Drinker, Experimenter, and Regular Drinker. At T1, Non-Drinker was the most prevalent latent status/class (59%), followed by Experimenter (20%) and Potential Drinker (11%), and Regular Drinker was the least prevalent (10%). However the prevalence of Mexican-heritage youth alcohol use latent statuses changed across the three time points. In particular, Regular Drinker became the most prevalent status at T3 (34%), followed by Non-Drinker (30%), Experimenter (22%), and Potential Drinker was the least common (14%).

The middle section of Table 3 shows the transition probability matrix with diagonal elements in bold font. The diagonal transitional probabilities in the matrix reflect the probabilities of membership in the same latent status at two consecutive times. Compared to other statuses, Regular Drinker was the most likely to retain across times (T1 to T2 and T2 to T3). In particular, those in the Regular Drinker status at T2 had a 83% chance of being in the same status again at T3. If Mexican-youth were to change their status from T1 to T2, the most likely transition was between the Potential Drinker and the Regular Drinker statuses (32%), indicating a 32% chance of transitioning from the Potential Drinker latent status to the Regular Drinker status. From T2 to T3, the most likely transition was between Experimenter and Regular Drinker (39%) meaning that those in the Experimenter status had a 39% chance of transitioning to the Regular Drinker status. There were also considerable movements/transitions from Non-Drinker to Experimenter (19% to 21%), meaning that about 20% chance of transitioning from the Non-Drinker status to the Experimenter status. Those in the Non-Drinker status were the least likely to transition to the Regular Drinker status and vice versa.

Identifying Characteristics That Predict Latent Transitions (RQ3 – RQ8)

Three parenting variables were introduced into logistic regression models as predictors of latent class/status membership and transition probabilities: general parent-child communication, targeted parent-child communication about alcohol, and parental monitoring. Two demographic variables, gender and age, were also included in the regression models. First, a set of multinomial logistic regression analyses was carried out to examine whether these parenting variables predicted latent status membership probabilities

at T1. In the multinomial regression models, four-category status membership (Non-Drinker is the reference status) was regressed on potential predictors including demographics, general and targeted parent-child communication, and parental monitoring. Overall significance tests for the effects of predictors on odds of membership indicated that targeted parent-child communication about alcohol ($p = .0003$) and parental monitoring ($p = .0001$) were significant predictors of latent status membership probabilities, while general parent-child communication was not significant ($p = .1110$). Additionally, gender and age were not statistically significant at .05 alpha level. Table 4 presents the results for the multinomial logistic regression analyses. Consistent with our anticipation, a greater level of targeted parent-child communication about alcohol and parental monitoring was associated with a lower probability of membership in the high risk statuses such as Experimenter, Potential and Regular Drinker statuses relative to membership in the Non-Drinker status.

Next, a set of binary logistic regression analyses was performed to examine the effects of covariates on latent status transition probabilities. In the binary regression models corresponding to each row of each transition probability matrix, the Non-Drinker status was used as a comparison group and the remaining statuses were combined to form the reference group. A total of sixteen logistic regression models were built to examine the effects of targeted parent-child communication about alcohol and parental monitoring on transition probabilities. By using binary outcomes, rather than five-category multinomial outcomes, we were able to skip some problematic logistic models but estimate coefficients in the remaining logistic regressions.

Results for the binary logistic regression are reported in Table 5. Targeted parent-child communication served as a protective force against alcohol use in Mexican-heritage youth, and in particular their transitions to higher risk statuses in relation to alcohol use (e.g., Regular Drink status). Among Mexican-heritage youth who started out in the Regular Drinker status at T1, one-unit increase in targeted parent-child communication about alcohol was associated with about three times greater likelihood of being in the Non-Drinker at T2 than likelihood of being in the other statuses. A greater level of targeted parent-child communication about alcohol was also associated with an increased probability of transitioning from the Potential Drinker at T2 to the Non-Drinker at T3 relative to the other statuses. Among Mexican-heritage youth in the Non-Drinker status at T1, those who reported a greater level of parental monitoring were about twice as likely to be in the same status at T2 ($OR = 1.945$), relative to membership in the all other high risk statuses (Experiment, Potential and Regular Drinker statuses). In addition, a greater level of parental monitoring was associated with an increased probability of transitioning from the Experimenter status at T2 to the Non-Drinker status at T3, relative to transitioning to all the other statuses combined (i.e., Experimenter, Potential and Regular Drinkers). Overall the protective effect of parental monitoring was more pronounced among those in the Non-Drinker status rather than those in the other high-risk statuses.

Discussion

Using longitudinal data, LCA was used to identify the four discrete subgroups characterized by response patterns in relation to Mexican-heritage youth alcohol use perceptions and

behaviors. These patterns were found to be consistent over the three time points. The study also investigated the longitudinal trends of the four subgroups/classes and parental influences predicting latent class membership and transition probabilities.

The findings indicated that Mexican-heritage youth's alcohol use perceptions and behaviors classified as the four distinct subgroups: Non-Drinker, Potential Drinker, Experimenter, and Regular Drinker. Inspection of the transition probabilities revealed that the longitudinal transitions of the class/status membership vary across classes/statuses and times (see Table 3). Mexican-heritage youth in the Non-Drinker status were more likely to transit to the Experimenter status (transition probabilities ranging from 19% [T1→T2] to 21% [T2→T3]) than to the Potential Drinker and the Regular Drinker statuses. There were minimal likelihoods of direct movement/transitions between the Non-Drinker and the Regular Drinker statuses as well as between the Experimenter and the Potential Drinker statuses. With regard to the likelihoods of transitioning from the Experimenter and Potential Drinker statuses to the Regular Drinker, higher risk status are fairly high, ranging from 27% to 39%, whereas the “backward” transitions to these two statuses were much smaller (4%–19%).

Based on the findings, we identified the stage-sequential patterns of alcohol use in Mexican-heritage youth. Mexican-heritage youth who had never tried alcohol were likely to experiment with it, even without forming positive perceptions in relation to alcohol, then become regular drinkers. The Experimenter and Potential Drinker appeared to be the intermediate statuses leading them to the Regular Drinker status. In particular, experimenting may play a critical role in alcohol use in adolescence. This is not surprising. However, what is perhaps of greater interest was the failure to observe the mediating effect of changes in attitudinal or normative perceptions that bring about intentional or behavioural changes suggested by behaviour change theories such as TRA and TPB. Perceptual/attitudinal changes (e.g., forming positive attitudes toward alcohol use or having pro-alcohol norms) may precede initial experimentation but does not appear to play significant role in later transitions to regular use.

It should be noted that these labels or categories differ from previous research that typically uses indicators of the amount of use resulting in classes that reflect a continuum based on the level of consumption (e.g., high, medium, low) (Henry & Muthén, 2010; Jackson et al., 2014) rather than the more conceptual categories emerging in the present analyses. It also should be noted that these four classes emerged empirically as the best fitting model in the separate LCAs computed at each point in time. In other words, the four-class model was not imposed on the data but based on AIC, BIC, and entropy statistics that the analysis provided.

In addition, not all parental practices were equally influential. Targeted parent-child communication about alcohol and parental monitoring were found as significant predictors for Mexican-heritage youth alcohol use. More specifically, targeted parent-child communication about alcohol significantly influenced the group of regular drinker from T1 to T2. That is, as Mexican-heritage youth engaged in targeted parent-child communication about alcohol, the probability to be in the status of regular drinker decreased. However, general parent-child communication did not significantly predict Mexican-heritage youth alcohol use. These findings supported the previous research suggesting that targeted parent-

child communication about alcohol is more effective to prevent youth from alcohol use than parent-child communication in general (Miller-Day & Kam, 2010; Reimuller et al., 2011).

Furthermore, the findings revealed that targeted parent-child communication about alcohol positively influenced changes in drinking status. First, it reduced the likelihood that members of the non-drinker group would transition to higher use over two later time points. The findings suggested that parents have profound impacts on Mexican-heritage youth who have never consumed alcohol by communicating with youth about alcohol. Next, targeted parent-child communication about alcohol also significantly predicted the transition from regular drinker in the first time point to the group of non-drinker in the second time point. An additional finding indicated that targeted parent-child communication about alcohol significantly predicted the transition from the group of potential drinker in the second time point to the group of non-drinker in the third time point. In other words, communication increased the likelihood that youth would stop drinking. It is plausible to argue based on these findings that parents shape youth norms, attitude, and intention toward alcohol use and such anti-alcohol-use socialization process may lead to higher levels of anti-alcohol norms, more negative attitudes, stronger intentions, and decreases in recent alcohol consumption.

Parental monitoring also significantly predicted the group of non-drinker at T1 to remain in the same group over two other time points, the transition from the experimenter group in the second time point to the group of non-drinker in the third time point and the transition from the potential drinker group in the second time point to the non-drinker group in the third time point. Overall, then, as a level of parental monitoring increased, Mexican-heritage reported high levels of youth anti-alcohol norms, attitude, and intention. These findings were consistent with previous research suggesting that parental monitoring prevent youth against alcohol use (Parsai et al., 2010; Strunin et al., 2013).

The present study is one of the few that examine patterns of Mexican-heritage youth alcohol use using longitudinal data and also tested parental influences during these transitions. This study shows theoretical implications by integrating two major behavior theories in prevention research, identifying stage-sequential patterns of Mexican-heritage youth alcohol use based on their internal and external outcomes, and including parental factors to test protective effects of parents on youth alcohol use. While transition from potential drinker to regular drinker is consistent with central tenets of TRA/TPB and other behavior theories, transition from experimenter to regular drinker is not well capture by traditional theories. Specifically, the postulated mediation of attitudes and norms was not observed. A new model or framework should be developed to better understand the process from initiation to regular use and abuse.

Findings also provide support for the conceptualization of targeted parent-child communication about substances. While previous work focus on overall openness of communication, the current line of research argues that the discussion of the topic of substances is crucial to understanding parent-child communication as a resiliency factor (Miller-Day, 2008). Indeed, such communication not only lessons the chances of accelerated use (e.g., from nondrinking to regular drinker) but can also be influential in reversing the process. What is less clear is if different targeted parent-child communication about alcohol

is needed at these various transition points. Finally, findings confirm the role of parental monitoring in substance use prevention. At the same time it becomes clear that monitoring not only inhibits initiation and continued use but, like targeted parent-child communication about alcohol, can reverse the process. Future research might examine interactions between monitoring and targeted communication.

The present study also provides several practical implications. As a result of the analysis, it is not surprising to discover that the percentage of youth alcohol use increases as they age and their alcohol use follows the stage-sequential pattern. This finding has important practical implications that preventions may need to target potential drinkers and experimenters. Based on the study's findings identifying distinctive characteristics of subgroups, it may be suggested that prevention should foster a more negative peer norms toward alcohol for potential drinkers and for experimenters, prevention should work on possible strategies that prevent the youth from continuing experimenting, such as limiting their alcohol access. Moreover, it might suggest that interventions target stages in the sequence.

What is, perhaps, more interesting is the finding suggesting that parents remain powerful and influential on youth developmental outcomes over time. Specifically, it is found that targeted parent-child communication about alcohol and parent monitoring serve as protective factors for Mexican heritage youth alcohol use behavior. In other words, through communication and monitoring, parents are highly likely to prevent youth from the initial use of alcohol as well as effectively socialize those who hold high levels of anti-substance use norms and low levels of alcohol use intention.

The differential effects are found in other groups. For instance, targeted parent-child communication about alcohol strongly influences regular drinkers to decrease their alcohol consumption from wave 1 to wave 2, whereas parental monitoring profoundly affects experimenter to reduce alcohol use from wave 2 to wave 3. That is, as parents engage in conversations about alcohol with their adolescent children who have regularly drunk alcohol, the rates of youth alcohol are likely to decrease. This finding shows the potential promise for reducing the prevalence of regular drinkers among 7th graders. For experimenter, on the other hand, parental monitoring plays a key role. By actively monitoring their 8th grade children, parents are more likely to lower the likelihood of those who hold high intention and use of alcohol but low anti-substance use norms than any other groups. This indicates that parental monitoring may be more effective in preventing actual use of alcohol than communication among 8th graders.

These findings have implications for prevention efforts based on the understanding of the target adolescents' norms, attitude, and substance use behavior as well as parent-child communication and monitoring. While parent interventions often discuss these factors, the current study demonstrates that among Mexican-heritage youth key transition moments exist from various use profiles and that along with monitoring, targeted parent-child communication rather than merely general communication is implicated in slowing transitions to increase use and should be incorporated into these interventions. In other words, while it is important that parents communicate with their child in general (Ackard, Neumark-Sztainer, Story, & Perry, 2006), at least among Mexican-heritage youth these

interactions must be about alcohol and alcohol use to slow the progress toward favorable norms and attitudes along with increased drinking. Furthermore, it is suggested that other interventions, including those that are school-based, might benefit from promoting parents as anti-substance use socialization agents by encouraging youth to seek out parents to talk about alcohol and alcohol use. Finally, future selective prevention efforts might target parents of pre-drinkers and drinkers in the intermediate stages in order to promote appropriate communication strategies. One note of caution should be considered. Our findings cannot separate parents who drink regularly or drink heavily from light drinkers or abstainers. It is unclear if this moderates the effects found in the current study and should be considered in future research.

Although the present study contributes to youth substance use prevention research, our findings should be carefully interpreted within the limitations of this study. A notable limitation is the absence of statistical tests involving particular odds ratios, although an omnibus test for the overall significance of a covariate on latent status membership is available. As a result it is hard to establish the association between the predictors and latent class/status membership and transition probabilities with full confidence. In addition, the sample in the study consisted largely of Mexican-heritage youth in Arizona, making our findings limited in terms of generalizability to other Hispanic groups. Another limitation is that only two demographic variables were included in the statistical models and their effects were estimated. We acknowledge that there may be other factors that critically affect youth drinking patterns and their transitions (e.g., socioeconomic status, time spent in U.S., acculturation, school performance), however we were not able to include these variables in the analyses due to the technical issue of non-convergence.

In conclusion, the present study provides stage-sequential patterns of Mexican-heritage youth alcohol use over time. Considering that parental prevention including targeted parent-child communication about alcohol and parental monitoring positively protect youth against alcohol use perception and behavior, it is strongly suggested that prevention programs need to be developed based on the patterns of youth alcohol use. It is also recommended that school-based intervention be modified to include and further encourage parents' involvement in youth substance prevention (Kumpfer, Alvarado, & Whiteside, 2003).

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Table 1
Fit statistics for fitting a latent class model for Mexican-heritage youth alcohol use

| Model | G-squared | DF | AIC | BIC | Adj-BIC | Entropy |
|----------------------|---------------|------------|---------------|---------------|---------------|-------------|
| 3-class model | 231.39 | 165 | 283.39 | 454.46 | 331.88 | 0.80 |
| 4-class model | 184.60 | 156 | 254.60 | 431.05 | 319.88 | 0.83 |
| 5-class model | 165.32 | 147 | 253.32 | 475.14 | 335.38 | 0.76 |
| 6-class model | 154.88 | 138 | 260.88 | 528.07 | 359.73 | 0.81 |

Table 2

Item-response probabilities of the four-class model at time 1 (T1)

| Item-response probabilities | <i>Non-Drinker</i> | <i>Potential Drinker</i> | <i>Experimenter</i> | <i>Regular Drinker</i> |
|-----------------------------|--------------------|--------------------------|---------------------|------------------------|
| Lifetime use (yes) | .133 (.020) | .000 (.000) | .919 (.047) | .836 (.051) |
| Last 30-day use (yes) | .004 (.006) | .093 (.075) | .609 (.066) | .764 (.056) |
| Use intent (yes) | .002 (.002) | .027 (.086) | .056 (.033) | .755 (.077) |
| Expectancies (agree) | .058 (.010) | .450 (.106) | .265 (.048) | .803 (.059) |
| Parent norm (angry) | .970 (.007) | .466 (.133) | .768 (.040) | .579 (.053) |
| Peer norm (negatively) | .894 (.016) | .000 (.009) | .558 (.051) | .151 (.045) |
| Personal norm (not ok) | .997 (.002) | .771 (.091) | .970 (.023) | .544 (.059) |

Note: The parameter estimates in the table are item-response probabilities and their standard errors. Large item-response probabilities (> .50) are in bold font to aid in interpretation.

Table 3

Latent status and transition probability matrix of the four-status model

| Latent Statuses | Non-Drinker | Potential Drinker | Experimenter | Regular Drinker |
|---|-------------|-----------------------------|--------------|-----------------|
| <i>Latent status prevalence</i> | | | | |
| Time 1 (09/05-09/05) | .591 | .108 | .204 | .097 |
| Time 2 (09/06-09/06) | .394 | .175 | .233 | .198 |
| Time 3 (09/07-09/07) | .301 | .142 | .221 | .336 |
| <i>Transition probabilities (T1 → T2)</i> | | <u>Time 2 latent status</u> | | |
| <u>Time 1 latent status</u> | | | | |
| Non-Drinker | .614 | .129 | .186 | .071 |
| Potential Drinker | .000 | .685 | .000 | .315 |
| Experimenter | .107 | .033 | .586 | .274 |
| Regular Drinker | .095 | .185 | .035 | .685 |
| <i>Transition probabilities (T2 → T3)</i> | | <u>Time 3 latent status</u> | | |
| <u>Time 2 latent status</u> | | | | |
| Non-Drinker | .690 | .059 | .213 | .039 |
| Potential Drinker | .118 | .439 | .072 | .371 |
| Experimenter | .025 | .140 | .443 | .392 |
| Regular Drinker | .015 | .044 | .110 | .831 |

Note: Diagonal transition probabilities are in bold to facilitate interpretation. Item-response probabilities > .50 are in bold to facilitate interpretation. Item-response probabilities were constrained to be equal across times (T1, T2, and T3), so only one set of these parameters is reported in the table.

Table 4

Odd ratios (ORs) for the effects of covariates on wave status membership probabilities at time 1 (T1)

| Latent Statuses | <i>Non-Drinker</i> | <i>Potential Drinker</i> | <i>Experimenter</i> | <i>Regular Drinker</i> |
|-------------------------------------|--------------------|--------------------------|---------------------|------------------------|
| <i>Odds ratios (ORs)</i> | | | | |
| Targeted Parent-Child Communication | --- | .662 | .464 | 1.024 |
| Parental Monitoring | --- | .258 | .176 | .361 |

Note: Only significant covariates are presented in the table. Dashes indicate the reference status

Table 5

Odds ratios (ORs) reflecting the effects of covariates on transition probabilities

| <i>Targeted Parent-Child Communication</i> | | | | |
|--|---------------------|--------------------|------------------------|--------------------------|
| <i>T1 latent status (row) by T2 latent status (column)</i> | <i>Experimenter</i> | <i>Non-Drinker</i> | <i>Regular Drinker</i> | <i>Potential Drinker</i> |
| Non-Drinker (Comparison) | .374 | 1.318 | 2.932 | .274 |
| Reference | --- | --- | --- | --- |
| <i>T2 latent status (row) by T3 latent status (column)</i> | | | | |
| Non-Drinker (Comparison) | .405 | 1.113 | .205 | 2.754 |
| Reference | --- | --- | --- | --- |
| <i>Parental Monitoring</i> | | | | |
| <i>T1 latent status (row) by T2 latent status (column)</i> | <i>Experimenter</i> | <i>Non-Drinker</i> | <i>Regular Drinker</i> | <i>Potential Drinker</i> |
| Non-Drinker (Comparison) | .301 | 1.945 | .000 | .256 |
| Reference | --- | --- | --- | --- |
| <i>T2 latent status (row) by T3 latent status (column)</i> | | | | |
| Non-Drinker (Comparison) | 19.997 | 1.950 | .000 | 1.034 |
| Reference | --- | --- | --- | --- |

Note: In the logistic regression models, Experimenter, Potential Drinker and Regular Drinker statuses were combined and served as a reference. Dashes indicate the reference statuses.